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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/519,599	03/06/2000	Kazuo Maeda	OKA-B914	8776

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EXAMINER

QUACH, TUAN N

ART UNIT PAPER NUMBER

2814

DATE MAILED: 08/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/519,599

Applicant(s)

MAEDA, KAZUO

Examiner

Tuan Quach

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 28-39 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 14-27 is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13 is/are rejected.
- 7) ☒ Claim(s) 9-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on March 6, 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This application contains claims 28-39 drawn to an invention nonelected with traverse in Paper No. 7. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claims 1, 5, 6, and 7 have been amended. The substitute specification filed June 4, 2002 has been received and is acceptable.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-8 and 13 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Vines et al. taken with Kapoor.

Vines et al. teach forming interlayer insulator by plasma-enhanced CVD using source gas including Si-C-O-H compound and oxidative gas, e.g., H₂O, including inert gas therein to form TEOS and annealing of the layer to eliminate water or other impurities in the dielectric layer, including oxidative anneal in oxygen containing ambient. See the abstract, column 1 lines 13-16, column 2 lines 1-40, line 52 to column 3 line 67, column 4 lines 20-40, lines 50-59. Vines et al. lack primarily the teachings of incorporating the boron.

Kapoor teaches forming insulator for integrated circuit structure comprising the dielectric layer comprising boron to reduce flow temperature. The annealing of the dielectric and a composite layer is also to form a porous dielectric layer by treatment in oxygen whereby the carbon is released and whereby porous layer is obtained.

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Subsequent provision of capping layer is also shown. See column 4 line 20 to column 6 line 11, lines 20-45, Figs. 2-4, column 7 lines 29-39.

It would have been obvious to one skilled in the art in practicing the Vines et al. process to have incorporated therein the inclusion of boron in the dielectric layer to obtain reduced flow temperature and to have effected the annealing such that carbon is released and porous film is obtained as suggested by Kapoor to obtain porous layer having impurities, water, carbon, etc., released from the film. The inclusion of capping layer is well known in the art as shown in Kapoor and as such would have been obvious. The use of alternative well known oxidative gas including oxygen is well known in the art and such substitution of one well known oxidative gas for another would have been obvious. The use of Ar as inert gas is well known in the art and such use would have been obvious. Oxygen plasma is well known reactive source of oxygen to enhance reactivity is well known in the art and thus would have been obvious to one skilled in the art.

Claims 9-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 14-27 are allowed.

Applicant's arguments filed June 4, 2002 have been fully considered but they are not persuasive.

Applicant argues that Vines et al. teach densified film and do not teach porous film, and that Kapoor teaches porous insulating film and that these goals are

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incompatible. The desired porosity and densification however are not mutual exclusive; Vines et al. do not preclude porosity from the film. Applicant's argument apparently fails to take into consideration the teachings of Kapoor wherein effecting the annealing in oxidative gas for the release of the gaseous products in the insulation material would leave the material porous. It remains that such porosity would be advantageous, e.g., to obtain lowering capacitance, Kapoor column 7 lines 29-39.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner